(25) $P(A) = 0.3$

$P(B) = 0.3$

Independent

$P(A|B) = P(A)$

$P(B|A) = P(B)$

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.3 + 0.3 - 0.09$

$= 0.51$

$P(A \mid B) = \dfrac{P(A \cap B)}{P(B)}$

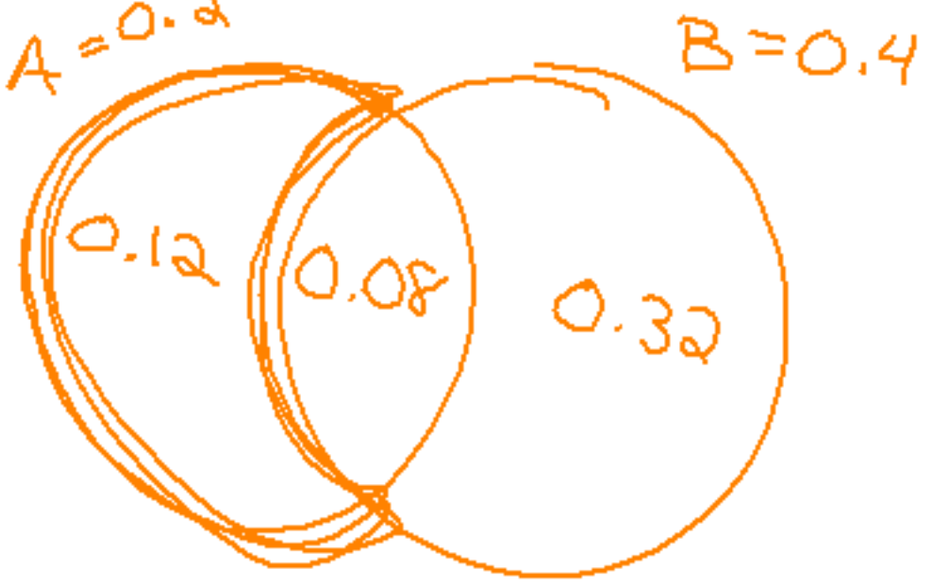
$0.3 = \dfrac{P(A \cap B)}{0.3}$

(26) $P(A)=0.2$

$P(B)=0.4$ $P(B^c)=0.6$

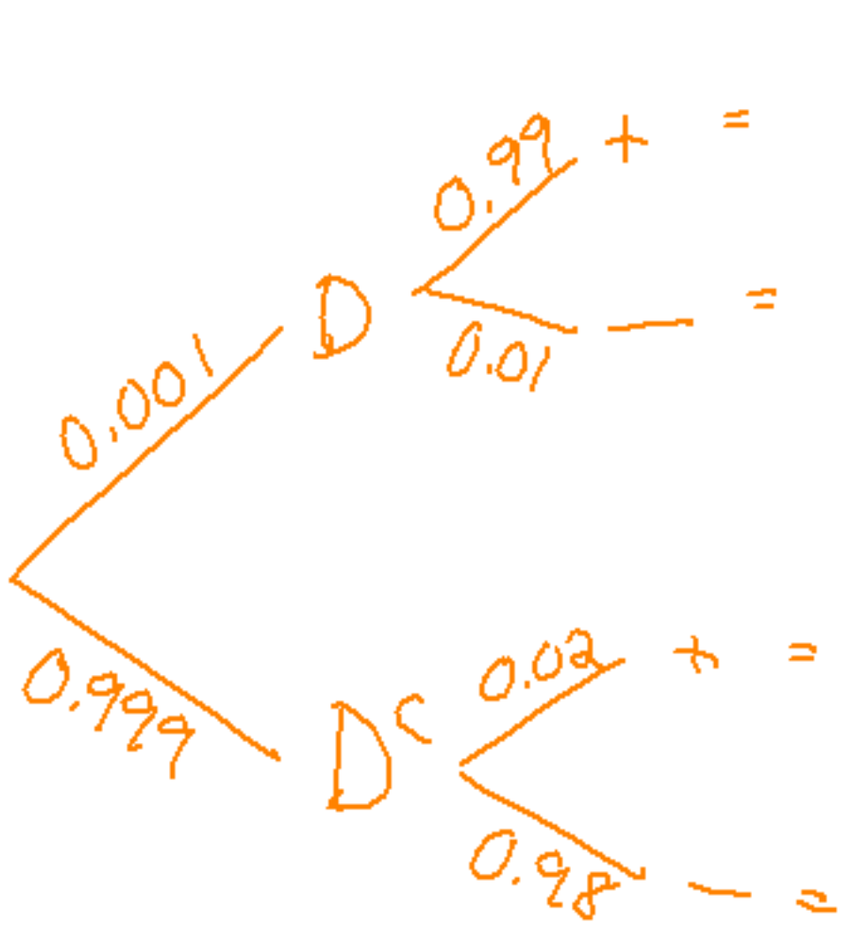
$P(A \overset{\text{and}}{\cap} B^c)$

$P(A \mid B) = \dfrac{P(A \cap B)}{P(B)}$



$0.2 = \dfrac{P(A \cap B)}{0.4}$

38



38 $P(+) =$

39 $P(D|+) = \dfrac{P(D \cap +)}{P(+)}$

(17) $P(A) = 0.2$

$P(B) = 0.8$

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$0.2 + 0.8 - 0$

$P(A \cap B) = 0$

~~8~~ $P(A \cap B) = 0.16$

~~8~~ $P(A \cap B)$

(32) $P(A|B) = \frac{P(A \cap B)}{P(B)} = \frac{0.1}{0.6}$

$P(A|B) = P(A)$

(33) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.5 + 0.6 - 0.1$

$= \underline{1}$

4.3

Flip coin: $S = \{H, T\}$

x2: $S = \{HH, HT, TH, TT\}$ } non num.

1 Dice: $\{1, 2, 3, 4, 5, 6\}$

2 Dice: $\{2, 3, 4, \ldots, 11, 12\}$ } numerical

* heads

Coin x2: $\{0, 1, 2\}$

Coin x10: $\{0, 1, 2, \ldots 9, 10\}$

*numerical

Random Var

- function
- associates a numerical value w/ each outcome.
- value of a random var will vary from trial to trial (variability of stat.)

Ex: coin toss x10 → $S = \{0, 1, 2, 3, 4, 5 \ldots 9, 10\}$

lightbulb-hrs burned → $S = \{0 \rightarrow \infty\}$

Discrete

- a var. that only takes specific, set outcomes
- only takes a finite # of values

Ex: Coin flip x10
$S = \{0, 1, 2, \ldots 9, 10\}$

Ex: # of kids in family

Ex: 10 Q MC quiz

Continuous

- rand. var. that can take any value in a specific interval.
- can take an infinite # of values

Ex: lightbulb hrs. burned
$S = \{0 \rightarrow \infty\}$

Ex: ht, wt.

Ex: time to run a mile

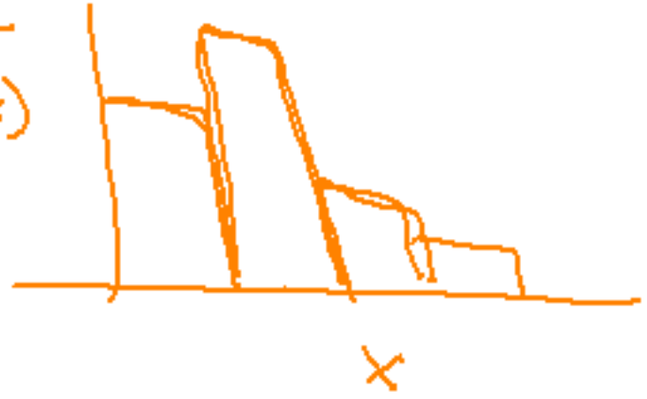
* Discrete

Probability Distr.

- list of outcomes + their probabilities

x	x_1	x_2	...	x_n
P(x)	$P(x_1)$	$P(x_2)$	...	$P(x_n)$

Prob. Hist:



Properties: $0 \le P(x_i) \le 1$

$\sum P(x_i) = 1$

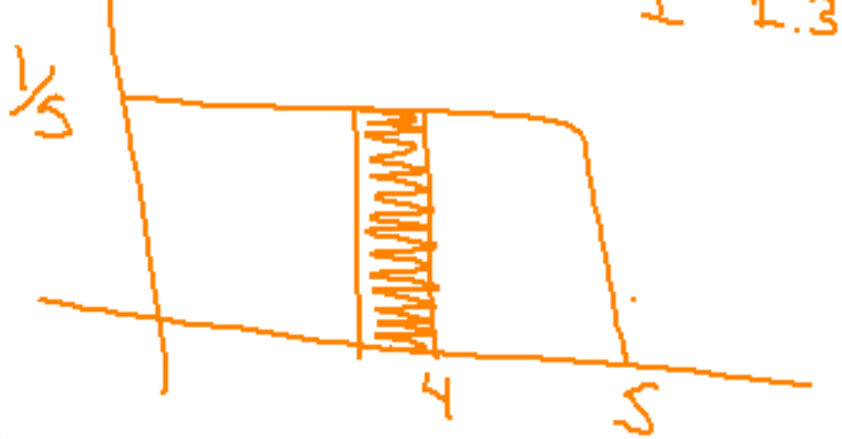
(CH. 2)

Continuous

Prob. Density Fctns:

- assign prob. to spec. intervals (not values)

Ex: normalcdf
$\mu =$
$\sigma =$

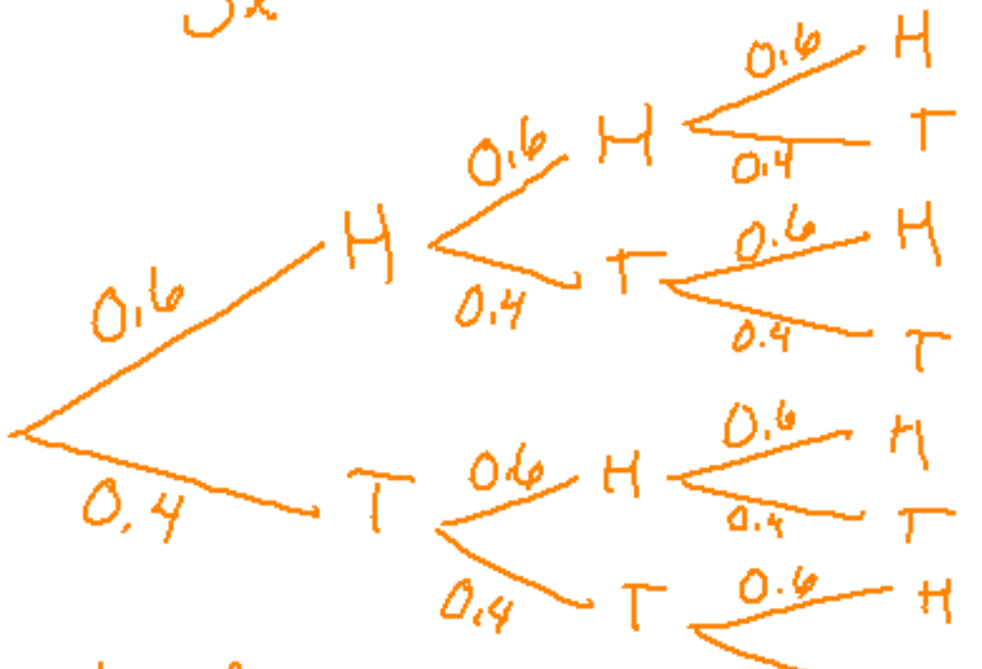


Prop: area under curve = 1

Ex: $P(H)=0.6$

$P(T)=0.4$

3x $S=\{0,1,2,3\}$



HHH = 0.216

HHT = 0.144

HTH = 0.144

HTT = 0.096

THH = 0.144

THT = 0.096

TTH = 0.096

TTT = 0.064

heads

X	0	1	2	3
P(x)	0.064	3×0.096	3×0.144	0.216
		0.288	0.432	

Formula: $P(X=k) = \binom{n}{k} p^k (1-p)^{n-k}$

$\binom{n}{k}$ → nCk

p^k → prob. of "success" "what you're looking for"

$(1-p)^{n-k}$ → prob. of "failure"

\# heads

X	$P(x)$
0	$(3nCr0)(0.6^0)(0.4^3) = 0.064$
1	$(3nCr1)(0.6^1)(0.4^2) = 0.288$
2	$(3nCr2)(0.6^2)(0.4^1)$
3	$(3nCr3)(0.6^3)(0.4^0)$

$P(x=1)$

4.3 Example 1

$P(H) = 0.32$

$P(O) = 0.68$

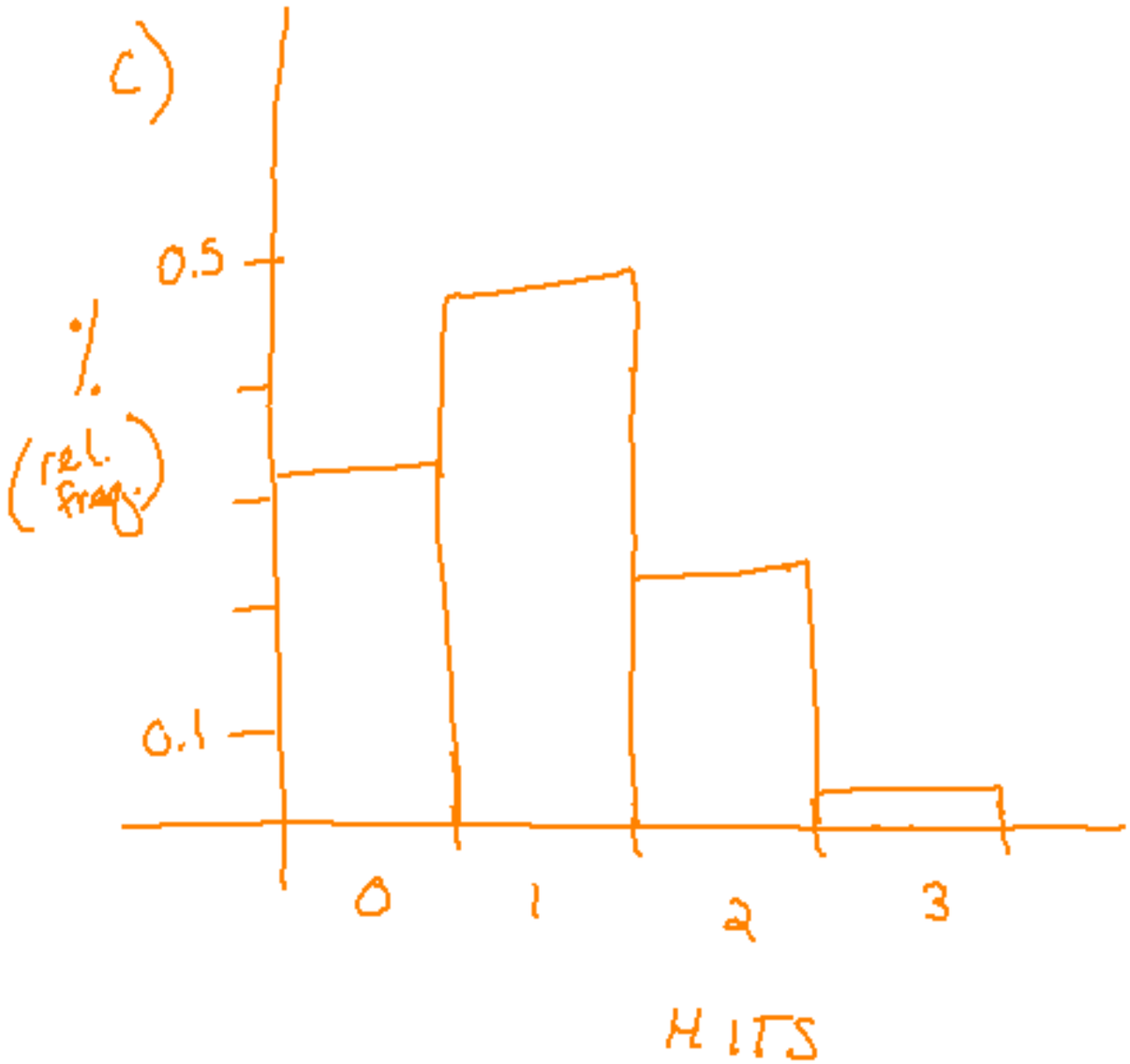
a)

HHH	OOH
HHO	OHO
HOH	HOO
OHH	OOO

b)

X	P(x)
0	$(3nCr0)(0.32^0)(0.68^3) = 0.3144$
1	$(3nCr1)(0.32^1)(0.68^2) = 0.4439$
2	$= 0.2089$
3	$= 0.0328$

c)



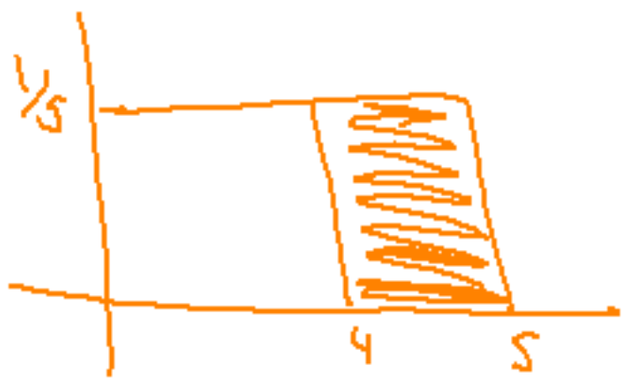
d) $P(x=3) =$ 0.0328

$P(x=1 \text{ or } x=2) = 0.4439 + 0.2089 =$ 0.6528

$P(x<1) =$ 0.3144

$P(x \geq 1) = 0.2089 + 0.0328 =$ 0.2417

$P(X=2) =$ 0.2089



$P(x \geq 4)$